Tricolored Blackbird (*Agelaius tricolor*)

Photo courtesy of Rob Schell Photography.

Legal Status

State: Species of Special Concern
Federal: Bureau of Land Management, U.S. Fish and Wildlife Service Bird of Conservation Concern
Critical Habitat: N/A
Recovery Planning: N/A
Notes: Previously listed as Category 2 Candidate Species in 1991 (56 FR 58804–58836).

Taxonomy

Tricolored blackbird (*Agelaius tricolor*) is endemic to the west coast of North America and primarily to California. No subspecies are currently recognized (Beedy and Hamilton 1999). Songs of male tricolored blackbirds are not regionally distinguishable, unlike those of some red-winged blackbird (*A. phoeniceus*) populations in California (Beedy and Hamilton 1999). Banding studies by Neff (1942, cited in Beedy and Hamilton 1999), DeHaven and Neff (1973, cited in Beedy and Hamilton 1999), and DeHaven et al. (1975a, cited in Beedy and Hamilton 1999) found no tricolored blackbirds from elsewhere among populations breeding from Santa Barbara County south to Baja California and east to the Sonoran Desert, suggesting potential for a separate metapopulation in southern California. Furthermore, more recent studies have found this species in Southern California are not genetically distinct (Pollinger and Berg, in preparation, cited in Feenstra 2012).

Distribution

General

Tricolored blackbird is largely endemic to California, and more than 90% of the population occurs in the state (Churchwell et al. 2005). Population surveys and banding studies of tricolored blackbird in the

Central Valley from 1969 through 1972 concluded that their geographic range and major breeding areas were unchanged since the mid-1930s (DeHaven et al. 1975b).

In any given year, more than 75% of the breeding population can be found in the Central Valley (Hamilton 2000), increasingly concentrated in the San Joaquin Valley. This trend appears to be continuing; the latest statewide survey found 88% of the 2011 breeding population concentrated in large colonies in Merced, Kern, and Tulare counties (Kyle and Kelsey 2011). Much smaller colonies are found in southern coastal counties and west of the desert in Southern California (Beedy and Hamilton 1999). The species also breeds in marshes of the Klamath Basin in Siskiyou and Modoc counties, and Honey Lake Basin in Lassen County. Small breeding populations also exist at scattered sites in Oregon, Washington, Nevada, and the western coast of Baja California (Beedy and Hamilton 1999) (Figure SP-B14). During winter, virtually the entire population of the species withdraws from Washington, Oregon (although a few remain), Nevada, and Baja California, and wintering populations shift extensively within their breeding range in California (Beedy and Hamilton 1999).

Distribution and Occurrences within the Plan Area

Historical

Tricolored blackbird historical breeding range in California included the Sacramento and San Joaquin valleys, lowlands of the Sierra Nevada south to Kern County, the coast region from Sonoma County to the border of Mexico, and sporadically on the Modoc Plateau (Dawson 1923; Neff 1937; Grinnell and Miller 1944).

Tricolored blackbird was described as locally common in the coastal area of Southern California and also bred on the western edge of the desert in Antelope Valley (Garrett and Dun 1981). Birds were resident year-round, dispersing only short distances from the breeding colonies (Garrett and Dun 1981).

There are four historical (i.e., pre-1990) occurrences recorded in the Plan Area and an additional four records with an unknown

observation date (CDFW 2013; Dudek 2013). These occurrences are located in the Harper Lake area, Palmdale/Lancaster area, and in the southwestern portion of Edwards Air Force Base (AFB) (Figure SP-B14).

Recent

[Note to Reader: additional verification on nature of occurrence data (colonies versus individuals) is ongoing as is the integration of recent Tricolored Blackbird Working Group data. This section will be updated as data become available.]

Tricolored blackbirds breed in lowland areas in the western and central portions of the Plan Area (Figure SP-B14). Breeding colonies occur in eastern Kern County from Ridgecrest along the base of the Tehachapi Mountains to Antelope Valley, around Palmdale and Lancaster in northeast Los Angeles County, and east of Barstow in San Bernardino County. There are 47 recent (i.e., since 1990) occurrences for the Plan Area (CDFW 2013; Dudek 2013). These occurrences generally are located in the Lancaster/Palmdale area, in the southwestern portion of Edwards AFB, just north of State Highway 138, along State Highway 158 in the Tehachapi Mountain foothills, west and south of Red Rock Canyon State Park, along the Trona Road cutoff north of State Highway 395, in the southern portion of the China Lake Naval Air Weapons Station north of Ridgecrest, and along the Mojave River east of Barstow (Figure SP-B14).

Natural History

Habitat Requirements

Breeding tricolored blackbirds form large colonies, typically in freshwater wetlands dominated by cattails (*Typha* spp.) or bulrushes (*Schoenoplectus* spp.) and thorny vegetation such as Himalayan blackberry (*Rubus armeniacus,* formerly *R. discolor*)(Churchwell et al. 2005). They may also nest in willows (*Salix* spp.), thistles (*Cirsium* and *Centaurea* spp.), and nettles (*Urtica* spp.) (Beedy and Hamilton 1999). They forage away from their breeding grounds in rice fields, lightly grazed pasture, dairies, or alfalfa fields. With the conversion of wetlands to arable land, tricolored blackbirds began exploiting the

rich agricultural fields created by the transition to farming. Recently, the species has been using dairies, which contain many of the necessary characteristics for breeding. As a result, the expanding dairy industry in the San Joaquin Valley has led to a shift in distribution and the concentration of species into mega-colonies of tens of thousands of birds. In 2008, 50% of breeding tricolors in California were observed nesting in silage fields (Kelsey 2008).

Tricolored blackbirds have three basic requirements for selecting their breeding colony sites: open, fresh water; a protected nesting site, provided by flooded, thorny, or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony (Hamilton et al. 1995; Beedy and Hamilton 1997, 1999; Churchwell et al. 2005). Almost 93% of the 252 breeding colonies reported by Neff (1937) were in freshwater marshes dominated by cattail and bulrush species. In contrast, only 53% of the colonies reported during the 1970s were in cattails and bulrushes (DeHaven et al. 1975a).

An increasing percentage of tricolored blackbird colonies in the 1980s and 1990s were reported in Himalayan blackberry (Cook 1996), and some of the largest recent colonies have been in silage and grain fields (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000). Other vegetation used by nesting tricolored blackbirds includes giant cane (*Arundo donax*), safflower (*Carthamus tinctorius*) (DeHaven et al. 1975a), tamarisk (*Tamarix* spp.), elderberry (*Sambucus* spp.), poison-oak (*Toxicodendron diversilobum*), and riparian scrub and forests (e.g., *Salix, Populus, Fraxinus*) (Beedy and Hamilton 1999).

Ideal foraging conditions for tricolored blackbird is created when shallow flood irrigation, mowing, or grazing keeps the vegetation at an optimal height (<15 cm [<5.9 inches]) (Tricolored Blackbird Working Group 2007). Preferred foraging habitats include agricultural crops such as rice, alfalfa, irrigated pastures, and ripening or cut grain fields (e.g., oats, wheat, silage, and rice), as well as annual grasslands, cattle feedlots, and dairies. Tricolored blackbird also forages in remnant native habitats, including wet and dry vernal pools and other seasonal wetlands, riparian scrub habitats, and open marsh borders (Tricolored Blackbird Working Group 2007). See Table 1 for a summary of tricolored blackbird habitat associations.

Table 1. Habitat Associations for Tricolored Blackbird

Land Cover Type	Land Cover Use	Habitat Designation	Habitat Parameters	Supporting Information
Wetland	Breeding	Primary	Cattails, bulrushes, willows, Himalayan blackberries (recent shift), thistles, nettles, and other spiny or thorny plants	Beedy and Hamilton 1999
Riparian	Breeding	Primary	Riparian woodland and scrub	Beedy and Hamilton 1999
Agricultural	Foraging	Secondary	Open pastures, silage, grain fields, mowed alfalfa, pastures, dairies	Beedy and Hamilton 1999
Herbaceous dominated	Foraging	Secondary	Native and non-native annual grasslands	Beedy and Hamilton 1999

Foraging Requirements

Tricolored blackbirds forage primarily in artificial habitat with ideal foraging conditions created in shallow flooded fields. Preferred foraging habitat includes crops, annual grasslands, cattle feedlots, and dairies (Beedy and Hamilton 1999). Foods delivered to tricolored blackbird nestlings include beetles and weevils, grasshoppers, caddisfly larvae, moth and butterfly larvae, and dragonfly larvae (Orians 1961a; Crase and DeHaven 1977; Skorupa et al. 1980; Beedy and Hamilton 1999). Breeding-season foraging studies in Merced County showed that animal matter makes up about 91% of the food volume of nestlings and fledglings, 56% of the food volume of adult females, and 28% of the food volume of adult males (Skorupa et al. 1980).

Adults may continue to consume plant foods throughout the nesting cycle, but they also forage on insects and other animal foods. Immediately before and during nesting, adult tricolored blackbirds are often attracted to the vicinity of dairies, where they take high-energy items from livestock feed. Adults with access to livestock feed (such as cracked corn) begin providing it to nestlings when they are

about 10 days old (Hamilton et al. 1995). More than 88% of all winter food in the Sacramento Valley is plant material, primarily seeds of rice and other grains, but also weed seeds (Crase and DeHaven 1978). In winter, tricolored blackbird often associates with other blackbird species (*Agelaius* spp.; *Euphagus* spp.), but flocks as large as 15,000 individuals (almost all tricolored blackbirds) may congregate at one location and disperse to foraging sites (Beedy and Hamilton 1999).

Reproduction

Tricolored blackbird is closely related to red-winged blackbird, but the two species differ substantially in their breeding ecology. Red-winged blackbird pairs defend individual territories, while tricolored blackbirds are among the most colonial of North American passerine birds (Bent 1958; Orians 1961a, 1961b, 1980; Orians and Collier 1963; Payne 1969; Beedy and Hamilton 1999). As many as 20,000 or 30,000 tricolored blackbird nests have been recorded in cattail marshes of 4 hectares (9 acres) or less (Neff 1937; DeHaven et al. 1975a), and individual nests may be built less than 0.5 meter (1.5 feet) apart (Neff 1937). The tricolored blackbird colonial breeding system may have adapted to exploit a rapidly changing environment where the locations of secure nesting habitat and rich insect food supplies were ephemeral and likely to change each year (Orians 1961a; Orians and Collier 1963; Collier 1968; Payne 1969). See Table 2 for a summary of seasonal migration, colony formation, and breeding.

Table 2. Key Seasonal Periods for Tricolored Blackbird

	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Colony Formation			✓	✓	✓							
Breeding			✓	✓	✓	✓	✓					
Migration			✓	✓	✓	✓	✓	✓	✓	✓		
Other							✓	✓	✓	✓		

Source: Beedy and Hamilton 1999.

Spatial Activity

During the breeding season, tricolored blackbird exhibits itinerant breeding, commonly moving to different breeding sites each season (Hamilton 1998). In the northern Central Valley and northeastern California, individuals move after their first nesting attempts, whether successful or unsuccessful (Beedy and Hamilton 1997). Banding studies indicate that significant movement into the Sacramento Valley occurs during the post-breeding period (DeHaven et al. 1975b).

During winter, virtually the entire population withdraws from Washington, Oregon (although a few remain), Nevada, and Baja California, and wintering populations shift extensively within their breeding range in California (Beedy and Hamilton 1999). Tricolored blackbird numbers decrease in the Sacramento Valley and increase in the Sacramento–San Joaquin River Delta and northern San Joaquin Valley (Neff 1937; Orians 1961a; Payne 1969; DeHaven et al. 1975b). By late October, large flocks of tricolored blackbird also congregate in pasturelands in southern Solano County and near dairies on Point Reyes Peninsula in Marin County (Beedy and Hamilton 1999). Other birds winter in the central and southern San Joaquin Valley. Concentrations of more than 15,000 wintering tricolored blackbirds may gather at one location and disperse up to 32 kilometers (20 miles) to forage (Neff 1937; Beedy and Hamilton 1999). Individual birds may leave winter roost sites after fewer than 3 weeks and move to other locations (Collier 1968), suggesting winter turnover and mobility. In early March and April, most birds vacate wintering areas in the Central Valley and along the coast, and move to breeding locations in the Sacramento and San Joaquin valleys (see Table 3) (DeHaven et al. 1975b). In the Plan Area, tricolored blackbirds appear to be more sedentary and winter close to their breeding colonies (Garret and Dunn 1981).

Table 3. Movement Distances for Tricolored Blackbird

Type	Distance/Area	Location of Study	Citation
Male territory (within colony)	20 to 35 square feet (0.8 to 3.25 m^2)	California	Lack and Emlen 1939; Orians 1961a

Type	Distance/Area	Location of Study	Citation
Dispersal	33% recovered within 10 miles of natal colonies	California	DeHaven et al. 1975b
Home range	May range widely in flocks to over 9 miles from active colony	California	Beedy and Hamilton 1999

Ecological Relationships

Tricolored blackbird occupies a unique niche in the Central Valley/coastal marshland ecosystems. In areas where the number of tricolored blackbirds is high, they are both aggressively and passively dominant to—and often displace—sympatric marsh nesting species, including red-winged and yellow-headed blackbird (*Xanthocephalus xanthocephalus*) (Orians and Collier 1963; Payne 1969).

Nest predation is a major cause of nesting failure at some tricolored blackbird colonies. Historical accounts documented the destruction of nesting colonies by a diversity of avian, mammalian, and reptilian predators. Recently, especially in permanent freshwater marshes of the Central Valley, entire colonies (>50,000 nests) have been lost to black-crowned night-heron (*Nycticorax nycticorax*), common raven (*Corvus corax*), coyote (*Canis latrans*), and other predators (Beedy and Hayworth 1992; Beedy and Hamilton 1999).

Population Status and Trends

Global: Declining (Beedy and Hamilton 1997, 1999)
State: Declining (Beedy and Hamilton 1997, 1999)
Within Plan Area: Unknown

The U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Game (CDFG), and California Audubon cosponsored intensive tricolored blackbird surveys (carried out by volunteers in suitable habitats throughout California) in 1994, 1997, 1999, 2000,

2004, 2008, and 2011 (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000; Green and Edson 2004; Churchwell et al. 2005; Kyle and Kelsey 2011). Local, regional, and statewide tricolored blackbird populations experienced major declines between 1994 and 2004. Statewide totals of adults in four late-April surveys covering all recently known colony sites were 369,359 (1994); 237,928 (1997); 104,786 (1999); 162,508 (2000); and >130,000 (low estimate for 2004). Several areas that historically supported large (>2,000 individuals) colonies in the Central Valley no longer have birds present (Green and Edson 2004; Hamilton 2004).

The Audubon species account for tricolored blackbird also reports a decline from 1994 to 2000, with numbers stabilizing since that time (Audubon 2012). However, results of the Audubon California 2011 statewide survey (Kyle and Kelsey 2011) show a dramatic drop in the species population numbers throughout the state: in all, slightly fewer than 260,000 birds were observed compared to 395,000 in the 2008 survey, a 33% decrease in the population.

Threats and Environmental Stressors

The greatest threats to this species are the loss and degradation of habitat as a result of human activities (Beedy and Hamilton 1999). One of the main causes for population decline has been the near elimination of native cattail wetland complexes throughout central California by agricultural expansion and conversion of wetlands (Kyle and Kelsey 2011). Tricolored blackbird subsequently exploited the croplands that replaced their native habitat. Because of the increasing importance of agricultural fields to the species and the use of Triticale (a hybrid of wheat and rye grown as silage on dairies) as nesting habitat, tricolored blackbirds are at high risk when farmers need to cut their silage in the middle of the tricolored blackbird breeding effort. Entire colonies of up to tens of thousands of nests have been destroyed by harvesting and plowing of agricultural lands (Beedy and Hamilton 1999).

In addition to direct loss and alteration of habitat, other factors also threaten tricolored blackbird populations (Beedy and Hamilton 1999). These factors include predation of fledglings and adults by black-crowned night herons and ravens (Hamilton 2004). In addition,

the application of herbicides and pesticides may affect the nesting success of colonies in agricultural areas (Beedy and Hamilton 1999). Various poisons and contaminants have caused mass mortality, including poisoning by strychnine, selenium, and spraying with mosquito abatement oil (Beedy and Hayworth 1992; Beedy and Hamilton 1999; Beedy 2008).

Conservation and Management Activities

A variety of proposed and ongoing conservation and management activities are relevant to the tricolored blackbird in or near the Plan Area. The Western Riverside Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP), adjacent to the Plan Area, conserves 420 acres of suitable primary habitat and 66,510 acres of suitable secondary habitat.

The Tricolored Blackbird Working Group lists eight goals for the species, including habitat conservation and the protection of silage-nesting tricolored blackbirds (Tricolored Blackbird Working Group 2007). Protection of historical colonies should be prioritized and habitat managed to enhance the three habitat requirements described previously to encourage nesting. Churchwell et al. (2005) recommend water management and cited the success of the water bank Conservation Reserve Program, a voluntary program for agricultural landowners that promotes water storage until mid-July.

In 1993 and 1994, CDFG and USFWS purchased portions of crops to preserve several large colonies in Kings, Fresno, and Tulare counties. These and other actions are thought to have resulted in an additional 37,000 and 44,000 first-year adults to the 1994 and 1995 breeding seasons, respectively (as cited in Beedy and Hamilton 1999). USFWS may also provide compensation for delayed harvest to allow nestlings to fledge.

Preservation of wetlands and acquisition of agricultural lands for wetland restoration do not always benefit tricolored blackbirds because they are typically managed for waterfowl and other species in ways that do not provide suitable habitat for tricolored blackbirds, particularly in the nesting season.

The Tricolored Blackbird Working Group has set a long-term target of increasing the population to 750,000 birds, which will require the creation of new breeding habitat and the enhancement of existing colony sites on public and private lands (Kyle and Kelsey 2011).

Data Characterization

Statewide tricolored blackbird surveys were conducted in California in 1994, 1997, 1999, 2000, 2004, 2008, and 2011 (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000; Green and Edson 2004; Kyle and Kelsey 2011). Additional surveys include data on local distribution and population trends (Neff 1937; DeHaven et al. 1975a).

A relatively large amount of literature is available for the tricolored blackbird because it is a highly visible, colonial bird species of conservation concern, commonly associated with wetland habitat. Beedy and Hamilton (1999) provide a comprehensive review of information available on general natural history, behavior, distribution and population changes, known demographics and population regulation, and conservation and management. A range-wide management plan was developed in 1997 (Beedy and Hamilton 1997) and the Tricolored Blackbird Working Group released a conservation plan for tricolored blackbirds in 2007.

Management and Monitoring Considerations

A conservation plan for tricolored blackbirds was developed in 2007 by the Tricolored Blackbird Working Group. In addition to the conservation activities described above, the conservation plan outlines several management and monitoring priorities:

- Document the annual breeding, foraging, and wintering distribution and long-term population trends of the species
- Monitor reproductive success and adult survivorship to more effectively assess population viability
- Develop a strategic monitoring program using standardized methods that can be compared across time and geography, and adaptively changed for maximum effectiveness

- Identify environmental characteristics associated with breeding success
- Improve understanding of population dynamics and add to existing scientific understanding of the species
- Support and facilitate management-oriented research on public and private land.

To document seasonal and spatial movements, including site fidelity, several thousand tricolored blackbirds have been color banded, and observers are encouraged to submit sightings of banded birds.

Species Modeled Habitat Distribution

This section provides the results of habitat modeling for tricolored blackbird, using available spatial information and occurrence information, as appropriate. For this reason, the term "modeled suitable habitat" is used in this section to distinguish modeled habitat from the habitat information provided in Habitat Requirements, which may include additional habitat and/or microhabitat factors that are important for species occupation, but for which information is not available for habitat modeling.

There are 277,915 acres of modeled suitable habitat for tricolored blackbird in the Plan Area. Appendix C includes a figure showing the modeled suitable habitat in the Plan Area.

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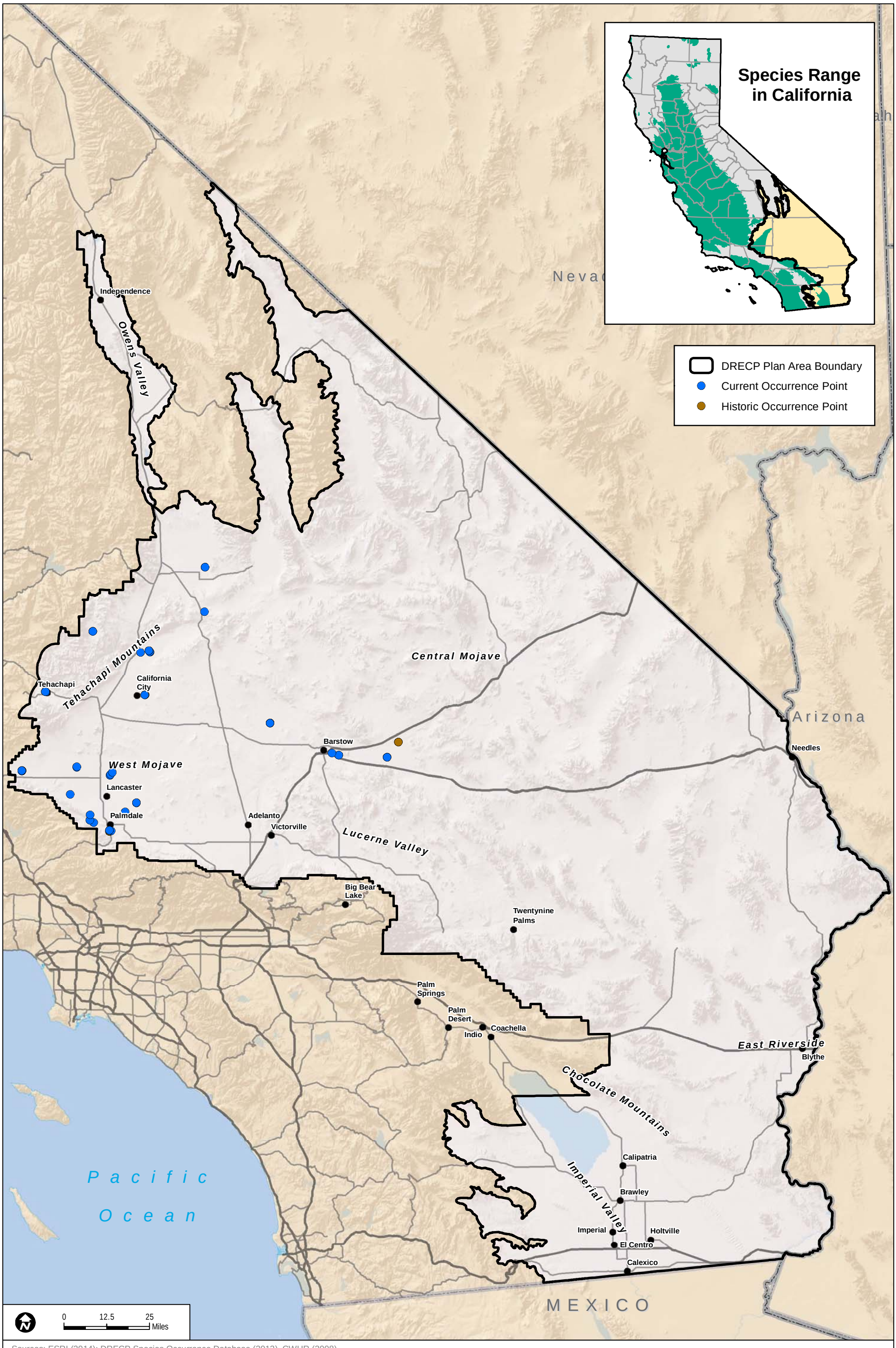

Sources: ESRI (2014); DRECP Species Occurrence Database (2013), CWHR (2008)

FIGURE SP-B12

Tricolored Blackbird Occurrences in the Plan Area